Timing at 2 mm valve lift

Engines	Camshaft code No.[1])	Intake valve opens after TDC	closes after BDC	Exhaust valve opens before BDC	closes before TDC
115.923/926, 115.938/939 and 115.951/954 low compression	05	14°	20°	22°	12°
115.951/954	13	14°	27°	36.5°	18.5°
(AUS) starting 1977, (J) and (S) starting 1976, (USA) starting 1974					
115.951/954	05	14°	20°	22°	12°

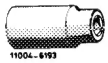
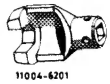
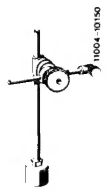
[1]) The camshaft code No. is punched into rear end of camshaft.

Valve clearance	with engine cold (approx. 20 °C)	with engine warm (60 °C ± 15 °C)
Intake	0.10[1])	0.15[1])
Exhaust	0.20	0.25

[1]) 0.05 mm higher during lasting outside temperatures below −20 °C.

Tightening torques	Nm
Nuts for cylinder head cover	15
Necked down bolt for camshaft sprocket	80
Valve adjusting screw	20–40

Special tools

Socket 27 mm, 1/2" square, for rotating engine	 11004-6193	001 589 65 09 00
Valve adjusting wrench 17 mm, 1/2" square	 11004-6201	110 589 00 01 00
Dial gauge holder	 11004-10150	363 589 02 21 00

Conventional tool

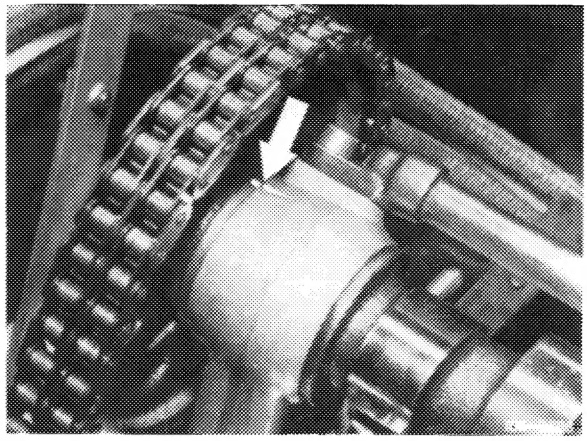
Dial gauge A 1 DIN 878	e.g. made by Mahr, D–7300 Esslingen order No. 810

Note

During assembly jobs, alignment of the markings (arrow) in ignition TDC position of 1st cylinder will be sufficient.

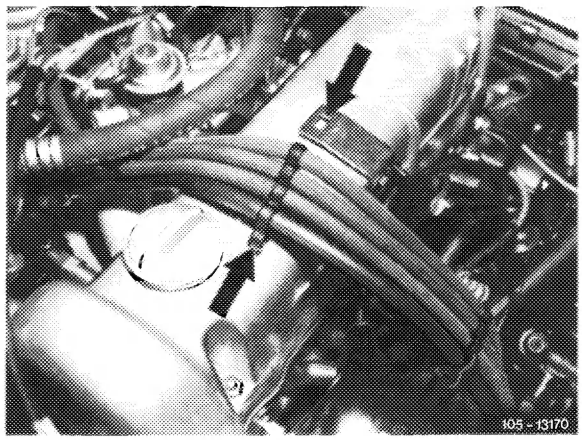
In special cases, e.g. in the event of complaints about performance, check and adjust begin of opening at intake valve of 1st cylinder.

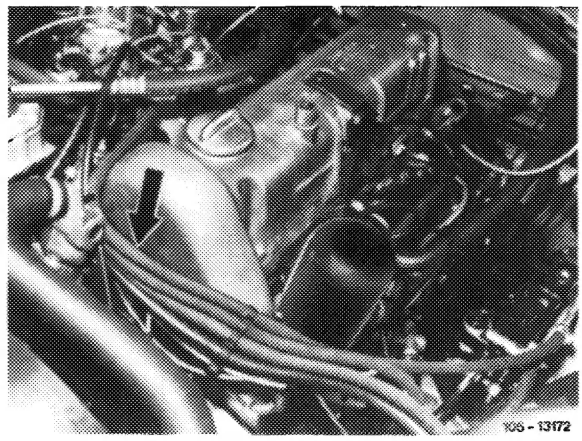
Timing is measured at 2 mm valve lift. For this purpose, the valve clearance must be neutralized.



Checking

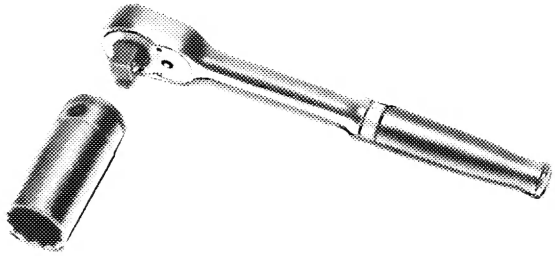
1 Remove cylinder head cover. For this purpose, for (AUS), (J), (S) and (USA) starting 1977, push out clamp assembly of fuel hoses on holder and pull down fuel hoses with clamp assembly in forward direction over cylinder head cover.





2 Keep turning crankshaft with tool combination until cam tip is pointing upwards.

Attention!
Do not rotate engine at fastening bolt of camshaft sprocket. Never rotate engine **backwards** while measuring since this will result in considerable measuring errors.



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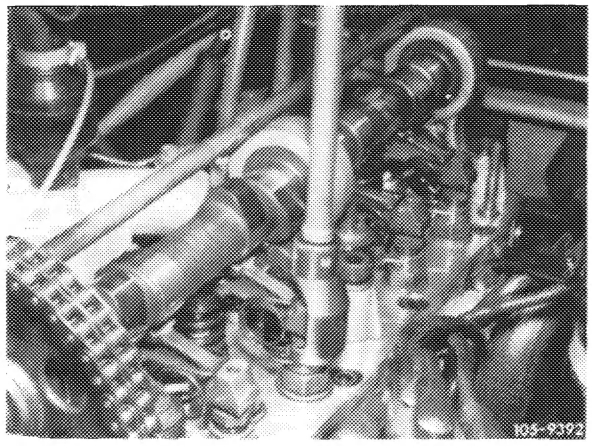
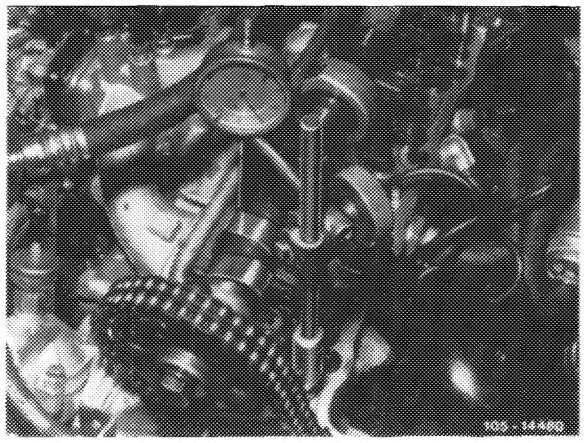
3 At intake valve of 1st cylinder, just neutralize valve clearance by unscrewing valve adjusting screw.



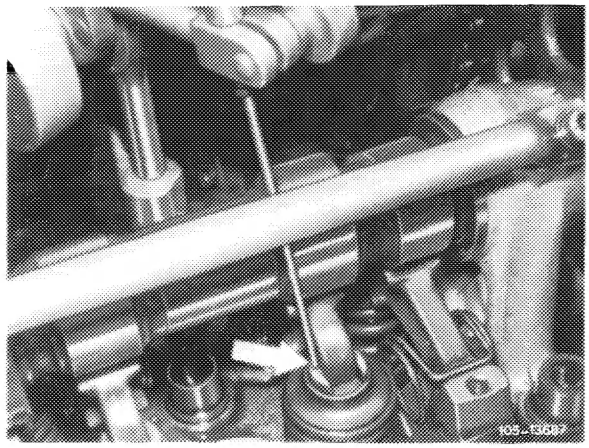
4 Screw dial gauge holder with threaded sleeve to stud at front left.



5 Insert dial gauge and attach in such a manner that the feeler pin is seated on edge of thrust piece under a preload of 3 mm (small needle of dial gauge).

Turn dial of dial gauge until large needle is at "0".

Attention!
The feeler pin of the dial gauge should be seated accurately vertical on edge of thrust piece.



6 Keep turning crankshaft in direction of engine by means of tool combination until the small needle of the dial gauge has gone back by 2 mm (valve lift) to 1 mm.

In this position, the value on vibration damper should be in agreement with the specified value "intake valve opens".

Corrections

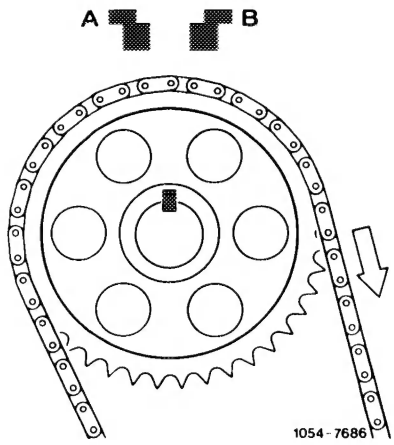
If the timing requires corrections, an offset Woodruff key or in the event of excessive chain elongation a new timing chain must be installed.

Woodruff keys are available with the following offsets:

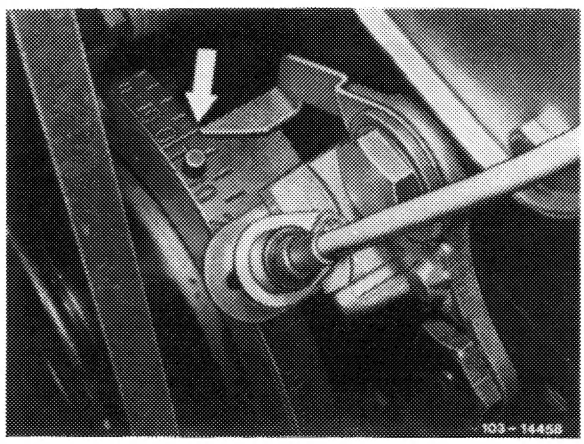
Offset mm	Part No.	for a correction of approx.	
0.7	621 991 04 67	4°	KW
0.9	621 991 02 67	6 1/2°	KW
1.1	621 991 01 67	8°	KW
1.3	621 991 00 67	10°	KW

An offset by one tooth on camshaft sprocket results in 18° on crankshaft.

An offset of Woodruff key to the right (in driving direction [A]) results in an early (advanced) begin of opening, and an offset to the left (B) in a later (retarded) begin of opening.

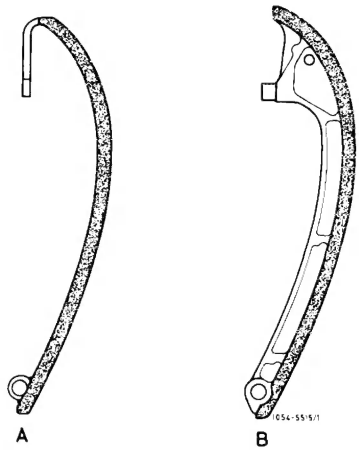


7 Set engine to ignition TDC of 1st cylinder.

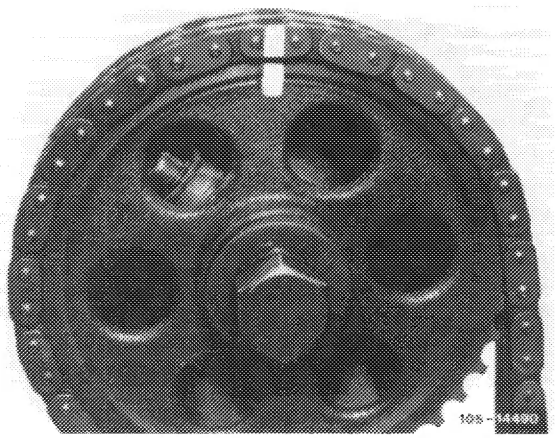


8 On engines 115.923/926/951 with tensioning chain version (A), remove chain tensioner (05–310).

On engines with light alloy tensioning rail (B), push back thrust bolt of chain tensioner.

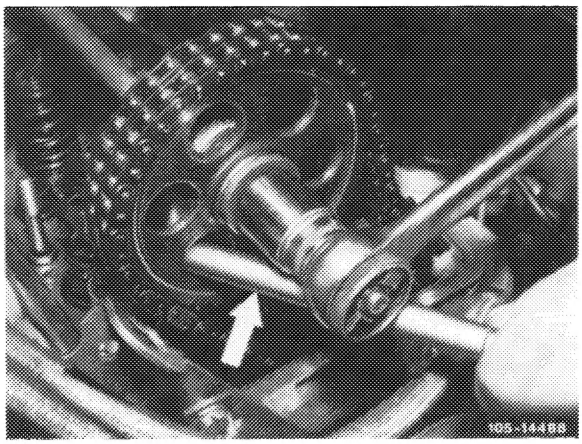


9 Mark camshaft sprocket and timing chain in relation to each other.



10 Remove camshaft sprocket.

To loosen necked-down screw, apply counterhold to camshaft sprocket by means of a screw driver or steel pin, loosen holder for fuel lines and swivel sideways.



11 Place cleaning rag under camshaft and remove Woodruff key.

12 Insert selected Woodruff key.

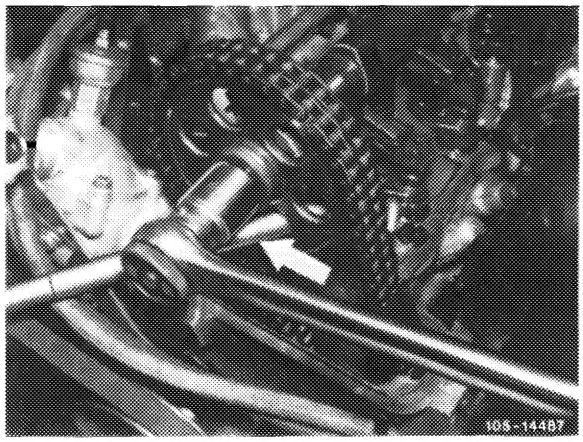
13 Mount camshaft gear while paying attention to color coding.

Do not tighten necked-down screw.

14 Repeat item 5 and 6.

15 Tighten necked-down screw for attaching camshaft sprocket to 80 Nm. For this purpose, apply counterhold to camshaft sprocket by means of a screw driver or steel pin.

16 On engines 115.923/926/951, install chain tensioner with tensioning rail version (A in Fig. item 8).



17 Unscrew dial gauge holder.

18 Adjust valve clearance at intake valve of 1st cylinder (05–210).